Author index

Abrol, Y.P., Sawhney, S.K. & Naik, M.S. Light and dark assimilation of nitrate in plants, 595
Ariovich, D. & Cresswell, C.F. The effect of nitrogen and phosphorus on starch accumulation and net photosynthesis in two variants of *Panicum maximum* Jacq., 657

Bagnall, D., Wolfe, J. & King, R.W. Chill-induced wilting and hydraulic recovery in mung bean plants, 457
Ball, M.C. (*see* Papp, J.C.), 675
Barber, J. Photosynthetic electron transport in relation to thylakoid membrane composition and organization, 311
Barg, R., Umiel, N. & Nitzan, Y. Sensitivity of tobacco tissue cultures to chloramphenicol and its photodegradation products, 77
Barg, R., Umiel, N. & Nitzan, Y. Fate of chloramphenicol in tobacco tissue culture under various light regimes, 83
Berry, J.A. (*see* Powles, S.B.), 117
Björkman, O. (*see* Powles, S.B.), 117
Blaauw-Jansen, G. Thoughts on the possible role of phytochrome-controlled responses: opinion, 173
Blum, A., Mayer, J. & Gozlan, G. Associations between plant production and some physiological components of drought resistance in wheat, 219
Borstlap, A.C. The use of model-fitting in the interpretation of 'dual' uptake isotherms, 407
Braun, Y. (*see* Lerner, H.R.), 501
Brownlee, C. (*see* Ginzburg, M.E.), 381

Caldwell, M.M. (*see* Robberecht, R.), 477
Clifford, P.E., Reid, D.M. & Pharis, R.P. Endogenous ethylene does not initiate but may modify geobending—A role for ethylene in autotropism, 433
Cockburn, W. Stomatal mechanism as the basis of the evolution of CAM and C_4 photosynthesis, 275
Colhoun, C.W. & Steer, M.W. The cytological effects of the gametocides Ethrel and RH-531 on microsporogenesis in barley (*Hordeum vulgare* L.), 21
Cook, H. & Oparka, K.J. Movement of fluorescein into isolated caryopses of wheat and barley: short communication, 239
Couderc, H. (*see* Vartanian, N.), 39
Cresswell, C.F. (*see* Ariovich, D.), 657
Croes, A.F. (*see* Zhang, H.-Q.), 471
Crozier, A. (*see* Sandberg, G.), 111
Crozier, A. (*see* Reeve, D. R.), 365

Deane-Drummond, C.E. (*see* Glass, A.D.M.), 247
Dedonder, A. (*see* Rethy, R.), 731
De Greef, J. (*see* Rethy, R.), 731
Dell'Antone, P. (*see* Macri, F.), 555
Dixon, M. & Grace, J. Natural convection from leaves at realistic Grashof numbers, 665
Duke, S.O. (*see* Vaughn, K.C.), 13

Edwards, W.R.N. & Jarvis, P.G. A method for measuring radial differences in water content of intact tree stems by attenuation of gamma radiation: technical report, 255
Eller, B.M. & Nipkow, A. Diurnal course of the temperature in a *Lithops* sp. (Mesembryanthemaceae Fenzl) and its surrounding soil, 559
Esashi, Y., Ishihara, N., Saijoh, K. & Satoh, M. A bimodal germination response to temperature in cocklebur seeds. I. Cyanide-sensitive and cyanide-resistant respirations, 47
Esashi, Y., Kuraishi, R., Tanaka, N. & Satoh, S. Transition from primary dormancy to secondary dormancy in cocklebur seeds, 493
Esashi, Y., Nagayama, T., Satoh, M. & Saijoh, K. A bimodal germination response to temperature in cocklebur seeds. II. ATP and adenylate pool, 55

Ferrell, W.K. (*see* Johnson, J.D.), 451
Fredericq, H. (*see* Rethy, R.), 731

Garrett, M.K. (*see* Osborne, B.A.), 135
Gifford, R.M. (*see* Rijven, A.H.G.C.), 417, 625
Gimmler, H. & Greenway H. Tetraphenylphosphonium (TPP^+) is not suitable for the assessment of electrical potentials in *Chlorella emersonii*, 739
Ginzburg, M.E., Brownlee, C. & Jennings, D.H. The influence of NaCl concentration on the amino acid and neutral soluble carbohydrate content of *Dunaliella*, 381
Glass, A.D.M., Siddiqi, M.Y. & Deane-Drummond, C.E. A multichannel microcomputer-based system for continuously measuring and recording ion activities of uptake solutions during ion absorption by roots of intact plants: technical note, 247
Goldstein, G. & Meinzer, F. Influence of insulating dead leaves and low temperatures on water balance in an Andean giant rosette plant, 649
Gordon, D. C. (*see* MacDonald, I.R.), 401
Gozlan, G. (*see* Blum, A.), 219
Grace, J. (*see* Dixon, M.), 665
Greenway, H. (*see* Gimmler, H.), 739
Greenway, H. & Munns, R. Interactions between growth, uptake of Cl^- and Na^+, and water relations of plants in saline environments. II. Highly vacuolated cells, 575
Greenway, H., Munns, R. & Wolfe, J. Interactions between growth, Cl^- and Na^+ uptake, and water relations of plants in saline environments. I. Slightly vacuolated cells, 567
Greenway, H. (*see* Setter, T.L.), 227
Greenway, H. & Watkin, E. Effects of external NaCl, and of changes in turgor pressure and volume, on K^+ concentrations in *Chlorella emersonii*, 393
Greer, D.H. (*see* Whitehead, D.), 703
Grossmann, K. Why does DNA-dependent RNA polymerase I from higher plants possess a more complex subunit structure than the enzyme from *Escherichia coli*? A hypothesis, 1
Guy, R. (*see* Lerner, H.R.), 501

Hanson, J.B. (*see* Zocchi, G.), 203
Hart, J.W. (*see* MacDonald, I.R.) 401
Hartung, W. The site of action of abscisic acid at the guard cell plasmalemma of *Valerianella locusta*, 427
Hasidim, M. (*see* Lerner, H. R.), 501
Hofer, U. (*see* Joggi, D.), 611
Hofslagare, O., Samuelsson, G., Sjöberg, S. & Ingri, N. A precise potentiometric method for determination of algal activity in an open CO_2 system, 195
Hole, C.C. & Scott, P.A. Effect of number and configuration of fruits, photon flux and age on the growth and dry matter distribution of fruits of *Pisum sativum* L., 31

Idle, D.B. & Proctor, C.W. An integrating sphere leaf chamber, 437
Ingri, N. (*see* Hofslagare, O.), 195
Isihara, N. (*see* Esashi, Y.), 47

Jarvis, P.G. (*see* Morison, J.I.L.), 95, 103
Jennings, D.H. (*see* Ginzburg, M.E.), 381
Jensen, E. (*see* Sandberg, G.), 111
Joggi, D., Hofer, U. & Nösberger, J. Leaf area index, canopy structure and photosynthesis of red clover (*Trifolium pratense* L.), 611
Johnson, C.B. & Whitelam, G.C. Enhancement of Pfr-mediated responses by light pretreatments: persistence of the pretreatment effects, 89
Johnson, I.R. & Thornley, J.H.M. Vegetative crop growth model incorporating leaf area expansion and senescence, and applied to grass, 721

Johnson, J.D. & Ferrell, W.K. Stomatal response to vapour pressure deficit and the effect of plant water stress, 451
Jones, D.A., Smith, A.M. & Woolhouse, H.W. An apparatus for pulse and pulse-chase experiments with $^{14}CO_2$ on attached leaves with known, steady-state rates of photosynthesis, 161
Jones, H.G. Estimation of an effective soil water potential at the root surface of transpiring plants, 671

Keys, A.J. (*see* Wallsgrove, R.M.), 301
King, R.W. (*see* Bagnall, D.) 457
Kuraishi, R. (*see* Esashi, Y.), 493

Lang, A. Turgor-regulated translocation, 683
Lang, A. & Thorpe, M.R. Analysing partitioning in plants, 267
Lea, P.J. (*see* Wallsgrove, R.M.) 301
Lee-Stadelmann, O.Y. (*see* Palta, J.P.), 601
Lerner, H.R., Reinhold, L., Guy, R., Braun, Y., Hasidim, M. & Poljakoff-Mayber, A. Salt activation and inhibition of membrane ATPase from roots of the halophyte *Atriplex nummularia*, 501
Leuning, R. Transport of gases into leaves, 183
Levitt, J. Plasmolysis shape in relation to freeze-hardening of cabbage plants and to the effect of penetrating solutes, 465
Lilley, R.McC. Chloroplast metabolism: the pathways of primary carbon metabolism in C_3 plants, 329
Long, S.P. C_4 photosynthesis at low temperatures, 345
Lüttge, U. (*see* Rygol, J.), 545

MacDonald, I.R., Hart, J.W. & Gordon, D.C. Analysis of growth during geotropic curvature in seedling hypocotyls, 401
Macri, F., Dell'Antone, P. & Vianello, A. ATP-dependent proton uptake inhibited by *Cercospora beticola* toxin in pea stem microsomal vesicles, 555
McWilliam, J.R. (*see* Wise, R.R.), 525
Maier-Maercker, U. The role of peristomatal transpiration in the mechanism of stomatal movement, 369
Marrè, E. (*see* Marrè, M.T.), 617
Marrè, M.T., Romani, G. & Marrè, E. Transmembrane hyperpolarization and increase of K^+ uptake in maize roots treated with permeant weak acids, 617
Mayer, J. (*see* Blum, A.), 219
Meinzer, F. (*see* Goldstein, G.), 649
Miflin, B.I. (*see* Wallsgrove, R.M.), 301
Mizuno, A. & Okamoto, H. Further examination of the effects of IAA and anoxia on the growth rate and the spatially separate electrogenic ion pumps in bean hypocotyl: short communication, 243
Mohr, H. (*see* Schmidt, R.), 235
Morgan, D.C., Rook, D.A., Warrington, I.J. & Turnbull, H.L. Growth and development of *Pinus radiata* D. Don: the effect of light quality, 691
Morison, J.I.L. & Jarvis, P.G. Direct and indirect effects of light on stomata. I. In Scots pine and Sitka spruce, 95
Morison, J.I.L. & Jarvis, P.G. Direct and indirect effects of light on stomata. II. In *Commelina communis* L., 103
Munns, R. (*see* Greenway, H.), 567, 575

Nagayama, T. (*see* Esashi, Y.), 55
Naik, M.S. (*see* Abrol, Y.P.), 595
Naylor, A.W. (*see* Wise, R.R.), 525
Nipkow, A. (*see* Eller, B.M.), 559
Nitzan, Y. (*see* Barg, R.), 77, 83
Nobel, P.S. Spine influences on PAR interception, stem temperature, and nocturnal acid accumulation by cacti, 153
Nobel, P.S. & Smith, S.D. High and low temperature tolerances and their relationships to distribution of agaves, 711
Nösberger, J. (*see* Joggi, D.), 611

Okamoto, H. (*see* Mizuno, A.), 243
Oparka, K.J. (*see* Cook, H.), 239
Öquist, G. Effects of low temperature on photosynthesis, 281
Osborne, B.A. & Garrett, M.K. Quantum yields for CO_2 uptake in some diploid and tetraploid species, 135

Palta, J.P. & Lee-Stadelmann, O.Y. Vacuolated plant cells as ideal osmometer: reversibility and limits of plasmolysis, and estimation of protoplasm volume in control and water-stress-tolerant cells, 601
Papp, J.C., Ball, M.C. & Terry, N. A comparative study of the effects of NaCl salinity on respiration, photosynthesis, and leaf extension growth in *Beta vulgaris* L. (sugar beet), 675
Parker, R.E. (*see* Quaite, E.), 429
Pharis, R.P. (*see* Clifford, P.E.), 433
Poljakoff-Mayber, A. (*see* Lerner, H.R.), 501
Pons, T.L. Significance of inhibition of seed germination under the leaf canopy in ash coppice, 385
Powles, S.B., Berry, J.A. & Björkman, O. Interaction between light and chilling temperature on the inhibition of photosynthesis in chilling-sensitive plants, 117
Praekelt, U.M., Rowe, A.J. & Smith, H. Crystalline arrays of ribosomes in isolated pea chloroplasts, 487
Proctor, C.W. (*see* Idle, D.B.), 437

Quaite, E., Parker, R.E. & Steer, M.W. Plant cell extension: structural implications for the origin of the plasma membrane, 429

Radin, J.W. Control of plant growth by nitrogen: differences between cereals and broadleaf species, 65
Rea, P.A. The dynamics of H^+ efflux from the trap lobes of *Dionaea muscipula* Ellis (Venus's flytrap), 125
Reeve, D.R. & Crozier, A. A reply to 'Information theory and plant growth substance analysis' by I.M. Scott, 365
Reid, D.M. (*see* Clifford, P.E.), 433
Reinhold, L. (*see* Lerner, H.R.), 501
Rethy, R., Dedonder, A., Fredericq, H. & De Greef, J. Factors affecting the induction and release of secondary dormancy in *Kalanchoë* seeds, 731
Rijven, A.H.G.C. & Gifford, R.M. Accumulation and conversion of sugars by developing wheat grains. 3. Non-diffusional uptake of sucrose, the substrate preferred by endosperm slices, 417
Rijven, A.H.G.C. & Gifford, R.M. Accumulation and conversion of sugars by developing wheat grains. 4. Effects of phosphate and potassium ions in endosperm slices, 625
Robberecht, R. & Caldwell, M.M. Protective mechanisms and acclimation to solar ultraviolet-B radiation in *Oenothera stricta*, 477
Robinson, D. & Rorison, I.H. Relationships between root morphology and nitrogen availability in a recent theoretical model describing nitrogen uptake from soil, 641
Romani, G. (*see* Marrè, M.T.), 617
Rook, D.A. (*see* Morgan, D.C.), 691
Rorison, I.H. (*see* Robinson, D.), 641
Rowe, A.J. (*see* Praekelt, U.M.), 487
Rygol, J. & Lüttge, U. Water-relation parameters of giant and normal cells of *Capsicum annuum* pericarp, 545

Saijoh, K. (*see* Esashi, Y.), 47, 55
Samuelsson, G. (*see* Hofslagare, O.), 195
Sandberg, G., Jensen, E. & Crozier, A. Effects of light on the catabolism of [2-^{14}C]-3-indole acetic acid in protoplasts, a chloroplast-rich fraction, and a crude cytoplasmic preparation from barley (*Hordeum vulgare* L.), 111
Satoh, M. (*see* Esashi, Y.), 47, 55, 493
Sawhney, S.K. (*see* Abrol, Y.P.), 595
Schäfer, E. (*see* Seyfried, M.), 633
Schmidt, R. & Mohr, H. Time course of signal transduction in phytochrome-mediated anthocyanin synthesis in mustard cotyledons: short communication, 235
Scott, I.M. An answer to Reeve & Crozier's reply, 367
Scott, P.A. (*see* Hole, C.C.), 31
Setter, T.L. & Greenway, H. Changes in the proportion of endogenous osmotic solutes accumulated by *Chlorella emersonii* in the light and dark, 227
Seyfried, M. & Schäfer, E. Changes in the optical properties of cotyledons of *Cucurbita pepo* during the first seven days of their development, 633

Sheriff, D.W. (*see* Whitehead, D.), 703
Siddiqi, M.Y. (*see* Glass, A.D.M.) 247
Sinclair, R. & Venables, W.N. An alternative method for analysing pressure-volume curves produced with the pressure chamber, 211
Sjöberg, S. (*see* Hofslagare, O.), 195
Smart, C.C. & Trewavas, A.J. Abscisic-acid-induced turion formation in *Spirodela polyrrhiza* L. I. Production and development of the turion, 507
Smart, C.C. & Trewavas, A.J. Abscisic-acid-induced turion formation in *Spirodela polyrrhiza* L. II. Ultrastructure of the turion; a stereological analysis, 515
Smith, A.M. (*see* Jones, D.A.), 161
Smith, H. (*see* Praekelt, U.M.), 487
Smith, S.D. (*see* Nobel, P.S.), 711
Steer, B.T. (*see* Wallace, W.), 5
Steer, M.W. (*see* Colhoun, C.W.), 21
Steer, M.W. (*see* Quaite, E.), 429

Tanada, T. Photogeneration of a bioelectric field by red and far-red irradiation in soybean hypocotyls, 69
Tanaka, N. (*see* Esashi, Y.), 493
Terry, N. (*see* Papp, J.C.), 675
Thornley, J.H.M. (*see* Johnson, I.R.), 721
Thorpe, M.R. (*see* Lang, A.), 267
Trewavas, A.J. (*see* Smart, C.C.), 507, 515
Trombalia, H.W. The effect of CO_2 on potassium transport by *Chlorella fusca*, 537
Turnbull, H.L. (*see* Morgan, D.C.), 691

Umiel, N. (*see* Barg, R.), 77, 83

Vartanian, N., Wertheimer, D.S. & Couderc, H. Scanning electron microscopic aspects of short tuberized roots, with special reference to cell rhizodermis evolution under drought and rehydration, 39
Vaughn, K.C. & Duke, S.O. *In situ* localization of the sites of paraquat action, 13
Venables, W.N. (*see* Sinclair, R.) 211
Vianello, A. (*see* Macri, F.), 555

Walker, N.A. The uptake of inorganic carbon by freshwater plants, 323
Wallace, W. & Steer, B.T. Isolation of *Capsicum annuum* leaf nitrate reductase and characterization of the effect of adenine nucleotides and NADH on its activity, 5
Wallsgrove, R.M., Keys, A.J., Lea, P.J. & Miflin, B.I. Photosynthesis, photorespiration and nitrogen metabolism, 301
Warrington, I.J. (*see* Morgan, D.C.), 691
Watkin, E. (*see* Greenway, H.), 393
Wertheimer, D.S. (*see* Vartanian, N.), 39
Whitehead, D., Sheriff, D.W. & Greer, D.H. The relationship between stomatal conductance, transpiration rate and tracheid structure in *Pinus radiata* clones grown at different water vapour saturation deficits, 703
Whitelam, G.C. (*see* Johnson, C.B.), 89
Williams, W.E. Optimal water-use efficiency in a California shrub, 145
Wise, R.R., McWilliam, J.R. & Naylor, A.W. A comparative study of low-temperature-induced ultrastructural alterations of three species with differing chilling sensitivities, 525
Wolfe, J. (*see* Bagnall, D.), 457
Wolfe, J. (*see* Greenway, H.), 567
Woolhouse, H.W. (*see* Jones, D.A.), 161

Zhang, H.-Q. & Croes, A.F. Protection of pollen germination from adverse temperatures: a possible role for proline, 471
Zocchi, G. & Hanson, J.B. Calcium transport and ATPase activity in a microsomal vesicle fraction from corn roots, 203

Book reviews

Books received

Baker, P.F. (ed.) Techniques in the Life Sciences. Techniques in Cellular Physiology, 74
Boulter, D. & Parthier, B. (ed.) Encyclopedia of Plant Physiology, Volume 14A. Nucleic acids and proteins in plants I, 261
Christiansen, M.N. & Lewis, C.F. (ed.) Breeding Plants for Less Favourable Environments, 73
Clark, F.E. & Rosswall, T. (ed.) Ecological Bulletins 33. Terrestrial Nitrogen Cycles, 262
Dodds, J.H. & Roberts, L.W. Experiments in Plant Tissue Culture, 73
Edwards, G. & Walker, D.A. C_3 C_4 Mechanisms, and Cellular and Environmental Regulation, of Photosynthesis, 747
Etherington, J.R. Environment and Plant Ecology, 2nd edn, 448
Ford, M.J. The Changing Climate: Responses of the Natural Flora and Fauna, 171
Gaspar, T., Penel, C.L., Thorpe, T. & Greppin, H. Peroxidases 1970-1980. A Survey of Their Biochemical and Physiological Roles in Higher Plants, 263
Gottlieb, O.R. Micromolecular Evolution, Systematics and Ecology, 523
Hall, J.L., Flowers, T.J. & Roberts, R.M. Plant Cell Structure and Metabolism, 2nd edn, 441
Hawkins, A.F. & Jeffcoat, B. Opportunities for Manipulation of Cereal Productivity, 523
Helene, C., Charlier, M., Montenay-Garestier, Th. & Laustraint, G. (ed.) Trends in Photobiology, 446
Huntley, B.J. & Walker, B.H. (ed.) Ecology of Tropical Savannas, 679
Johri, B.M. (ed.) Experimental Embryology of Vascular Plants, 679
Juniper, B.E. & Jeffree, C.E. Plant Surfaces, 748
Lange, O.L., Nobel, P.S., Osmond, C.B. & Ziegler, H. (ed.) Encyclopedia of Plant Physiology, New Series Volume 12A, Physiological Ecology I. Physical Environment, 442
Lange, O.L., Nobel, P.S., Osmond, C.B. & Ziegler, H. (ed.) Encyclopedia of Plant Physiology, New Series Volume 12B, Physiological Plant Ecology II. Water relations and carbon assimilation, 443
Loewus, F.A. & Tanner, W. (ed.) Encyclopedia of Plant Physiology, Volume 13A. Plant Carbohydrates I. Intracellular Carbohydrates, 169
Loewus, F.A. & Tanner, W. (ed.) Encyclopedia of Plant Physiology, Volume 13B. Plant Carbohydrates II. Extracellular Carbohydrates, 170
McClaren, J.S. Chemical Manipulation of Crop Growth and Development, 265
Marganis, N.S. & Mooney, H.A. (ed.) Components of Productivity of Mediterranean-Climate Regions: Basic and Applied Aspects, 170
Martin, M.H. & Coughtrey, P.J. Biological Monitoring of Heavy Metal Pollution, 441
Mohlenbrock, R.H. The Illustrated Flora of Illinois. Flowering Plants: Basswoods to Spurges, 75
Morris, G.J. & Clarke, A. (ed.) Effects of Low Temperatures on Biological Membranes, 167
Nover, L., Luckner, M. & Parthier, B. (ed.) Cell Differentiation: Molecular Basis and Problems, 168
Pate, J.S. & McComb, A.J. (ed.) The Biology of Australian Plants, 264
Penning de Vries, F.W.T. & Van Laar, H.H. (ed.) Simulation of Plant Growth and Crop Production, 445
Reinert, J. & Yeoman, M.M. Plant Cell and Tissue Culture—A Laboratory Manual, 442
Robertson, G.P., Herrera, R. & Rosswall, T. (ed.) Nitrogen Cycling in Ecosystems of Latin America and the Caribbean, 680
Sestak, Z. & Catsky, J. (ed.) Photosynthesis Bibliography, Volume 8 1977, Volume 9 1978, Volume 10/1 1979, 171
Smith, H. & Grierson, D. (ed.) The Molecular Biology of Plant Development, 444

Svensson, M. (ed.) Ecological Bulletins 30. Ecology of a Subarctic Mire, 168
Thompson, R. (ed.) *Vicia faba:* Physiology and Breeding, 447
Unsworth, M.H. & Ormrod, D.P. (ed.) Effects of Gaseous Air Pollution in Agriculture and Horticulture, 748
Wells, K. & Wells, E. (ed.) Basidium and Basidiocarp. Evolution, Cytology, Function and Development, 264
Woolhouse, H.W. (ed.) Advances in Botanical Research, Vol. 9, 745

Reviewers

Baker, D.A., 447
Baxter, R., 265
Billett, M., 168
Blyth, J., 680
Boulter, D., 444
Clarkson, D.T., 264
Cockburn, W., 747
Cutter, E.G., 679
Elston, J., 170
Gooday, G.W., 170
Gornall, R.J., 75
Hall, M.A., 441
Hallam, N.D., 748
Harborne, J.B., 523
Harper, J.L. 171
Heslop-Harrison, J., 745
Jarvis, P.G. 171, 748
Jennings, D.H., 443
Mantell, S.H., 442
Matthews, J.A., 261
Mayer, R.J., 74
Moore, P.D., 168
Presti, D.E., 446
Raison, J.K., 167
Raven, J.A., 442
Rhodes, M.J.C., 263
Roberts, T.M., 441
Rorison, I.H., 262
Simon, E.W., 73
Stanhill, G., 448
Stoddart, J.L., 523
Syrett, P.J., 169
Thornley, J.H.M., 445
Watling, R., 264
White, F., 679
Yeoman, M.M., 73

Subject index

Abscisic acid, 427, 457, 507, 515
Absorptance, 711
Absorption, 633
Acclimation, 281, 711
Acer, 665
Acridine orange, 555
Adaptation, 281
Adenine nucleotides, effect of, 5
Adenylate, 55
Adsorption, 739
Agavaceae, 711
Allium cepa, 601
Amino acid biosynthesis, 301
Amino acids, 381
Ammonia assimilation, 301
Anoxia, 243
Anthocyanin synthesis, 235
Apical dominance, 691
Apple, 671
Ash coppice, 385
Assimilate partitioning, 31, 683
Assimilation rate, net, 65
ATP, 55
ATPase, 203
ATPase, salt effect on, 501
Atriplex nummularia, 501
Autotropism, 401, 433
Auxin, 429
Auxin antagonists, 125
Auxins, 125
Avena sativa, 429
Axial growth, 493

Barley, 21, 65, 111, 239
Bean, 525
Benson-Calvin cycle, 329
Beta vulgaris, 675
Bicarbonate (HCO_3^-), 323
Bioelectric field, 69
Blue light, 95
Boundary layer resistance, 665
Brassicaceae, 89, 235, 525
Brassica oleracea, 465, 525
Broadleaf species, 65
Bundle sheath chloroplasts, 657
Butyrate, 617

Cabbage, 465
Cactaceae, 153
Callose, 21
Callus, 77
Calmodulin, 203
CAM, 275
Canopy structure, 611
Capsicum annuum, 5, 545
Carbon accumulation, 675
Carbon, inorganic, 323
Carbon metabolism, photosynthetic, 275
Caryopsis, 239
Catabolism, 111
Ca^{2+} transport, 203
Cell elongation, 429
Cells highly vacuolated, 575; slightly vacuolated, 567
Cell wall, 739
Cercospora beticola toxin, 555
Cereals, 65
Charophyta, 323
Chemiosmotic theory, 323
Chenopodiaceae, 675
Chilling, 281, 493
Chilling damage, 345
Chilling injury, 525
Chilling-light, 117
Chloramphenicol, 77, 83
Chlorella emersonii, 227, 393, 739
Chlorella fusca, 537
Chlorophyceae, 227, 537
Chlorophyta, 323
Chloroplasts, 111, 301, 487
Chromatography, 83
Cirsium palustre, 385
Cl^- fluxes, regulation, of, 567
Clones, 691
CO_2 assimilation, 537
CO_2 assimilation rate, net, 103
$^{14}CO_2$ pulse-chase, 161
Cocklebur, 47, 55, 493
CO_2 concentration, intercellular, 95, 103
Compositae, 47, 55, 385, 433, 493, 649
Cold, 711
Collard, 525
Competition, 31
Cotton, 65, 525
C_4 photosynthesis, 275, 345
C_4 plant distributions, 345
C_4 plants, temperate, 345
Crassulaceae, 731
Crassulacean acid metabolism, 153, 711
Cress, 401
Crop growth, 721
Cruciferae, 39, 401
Cryofixation, 39
Crystals, 487
Cucumber, 401
Cucumis sativus, 401
Cucurbitaceae, 401
Cucurbita pepo, 633
Curve-fitting, 407
Cytochrome *f* oxidation-reduction, 13
Cytomorphology, 601

Dandelion, 433
Dark, 227
Dark regulation, 595
Dark respiration, 595, 675
Degradation, 83, 111
Desert, 711
Destruction, 173
Dictyosome activity, 429
Differentiation, 77
Dionaea muscipula, 125
Dormancy, primary, 493; secondary, 493
Douglas fir, 451
Drought, 39
Duckweeds, 507, 515
Dunaliella parva, 381
Dunaliella spp., 381

Ecophysiology, 153
Elasticity, 545
Electrogenic ion pumps, 243
Electron microscopy, quantitative, 429
Electron transport, 311
Endomembrane concept, 429
Endosperm, developing, 417, 625
Energy requirements, 567, 575
Engelmann spruce, 451

Enzymes, chloroplast, 329
Epidermis, 601
Espeletia timotensis, 649
Ethrel, 21
Ethylene, 433
Ethylene production, 493
Evolution, 1, 275
Exine, 21
Expansion growth, 567, 575
Exposure-response curve, 173

Fabaceae, 525
Far-red light, 69
Ferocactus acanthodes, 153
Fieldbean, 117
Flavonoids, 477
Fluorescein, 239
Fragaria × *ananassa*, 451
Frailejon, 649
Freeze-hardening, 465
Freezing, 281, 559
Fruit growth, 31
Fusicoccin, 125, 203

Gametocides, 21
Gamma ray attenuation, 255
Gaseous transport, 181
Gas-exchange measurement, 161
Geotropism, 401, 433
Geum urbanum, 385
Giberellic acid, 731
GLC analysis, 381
Glycine max, 69
Glycolysis, 329
Goodness of fit, 407
Gossypium hirsutum, 65, 525
Gramineae, 417, 429, 625
Grashof number, 665
Grass crop, 721
Green algae, 537
Green light, 69
Growth, 675
Growth analysis, 267, 401
Growth rate, 243; relative, 65
Guard cell plasmalemma, 427

Halophilism, 381
Halophyte, 501
Heat, 711
Heat stress, 471
Heat transfer, 665
H^+ efflux, 125
Herbivory, 153
Higher plants, 135, 595
Hordeum vulgare, 21, 65, 111, 239
Hydraulic conductivity, 545; changes in, 457
Hydraulic resistance, 649, 671
Hypocotyl, 243

3-indole acetic acid, 111, 243
Intracellular pH, 537
Ion fluxes, 247; regulation of, 575

Juvenile-adult material, 691

K^+, 247
Kalanchoë blossfeldiana, 731
KCN, 493
Kinetics, 407
K^+ transport, 537
K^+ uptake, 617
Kubelka–Munk theory, 633

Layers, unstirred, 323
Leaf, 711
Leaf chamber, 437
Leaf age, 611
Leaf area, 219, 611, 721
Leaf chamber measurements, 181
Leaf epidermal optical properties, 477
Leaf expansion, 65
Leaf senescence, 219
Leaf temperature, 559
Leguminosae, 31, 117, 243, 555, 611
Lemnaceae, 507, 515
Lepidium sativum, 401
Light, 103, 227
Light absorptance, 135
Light activation, 329
Light gradients, 633
Light interception, 611
Light regulation, 595
Liliaceae, 471
Lilium longiflorum, 471
Lily, 471
Lipids, 311
Lithops, 559
Lombardy poplar, 211
Low temperature, 281; effects of, 649

Macrophytes, aquatic, 323
Malus pumila, 671
Malvaceae, 525
Marsh thistle, 385
Membrane potential, 243, 739
Membrane transport, 323
Mesembryanthemaceae, 559
Metabolites, 329
3-*O*-methylglucose accumulation, 393
Microalgae, 567
Microcomputer, 247
Microsomal vesicles, 555
Microsporogenesis, 21
Model, 267, 407, 721
Modulus of elasticity, 211
Morphology, 711
Multiphasic concept, 407
Mustard, 89, 235

NADH, inactivation by, 5
Na^+ fluxes, regulation of, 567
NaN_3, 493
Natural convection, 665
Needle growth, 691
Neutral carbohydrates, 381
Nicotiana tabacum, 77, 83
Nitrate, 657
Nitrate assimilation, 195, 595
Nitrate reductase, 5
Nitrogen nutrition, 65
NO_3^-, 247
Non-solvent space, 601

Oats, 429
Oenothera stricta, 477
Onagraceae, 477
Optical properties, 633
Optimality, 145
Opuntia bigelovii, 153
Organization, 311
Orthophosphate, 329
Osmoregulation, 381
Osmotic adjustment, 219
Osmotic dehydration, 601
Osmotic solutes, 227
Oxidative pentose phosphate cycle, 329

Panicum maximum, 657
Paraquat, 13
Partitioning, 267
Pea, 31, 487, 555
Pea bean, 243
Penetrating solutes, 465
Pentose phosphate pathway, 595
Pepper fruit, 545
Peristomatal transpiration, 369
Permeability, 739
Peroxide, 13
Pfr, 89
pH, 247
Phaseolus vulgaris, 117, 525
pH homeostasis, 537
pH, intracellular 617
Phosphate, 625
Phosphoenolpyruvate carboxylase, 345
Phosphorus, 657
Photodegradation, 77, 83
Photoinhibition, 117; at low temperature, 345
Photon yield, 135
Photorespiration, 301
Photosynthesis, 117, 153, 281, 301, 323, 437, 611, 675; regulation of, 329, steady state, 161
Phytochrome, 69, 89, 173, 633, 731
Phytochrome action, 235
Phytochrome photoequilibrium, 691
Picea engelmannii, 451
Pinaceae, 451, 703
Pinus contorta, 255
Pinus radiata, 691, 703
Pisum sativum, 31 487, 555, 601
Plasmolysis, 601
Plasmolysis shape, 465
Plastid ultrastructure, 13
Pollen germination, 471
Polyblepharidaceae, 381
Polyploidy, 135
Populus nigra, 211
Potassium, 625, 683; as osmotic solute, 393
Potentiometric measurements, 195
Pressure chamber, 211
Pressure probe, 545
Pretreatments, 89
Proline, 227, 471
Proteins, 311
Protein synthesis, 471
Proton extrusion, 537
Proton pump, 617
Proton translocation, 555
Protoplasmic viscosity, 465
Protoplasm volume, 601
Protoplasts, 111
Pseudotsuga menziesii, 451
Pyruvate orthophosphate dikinase, 345

Quantum yield, 135, 437
Quercus, 665

Radiata pine, 703
Radiation, photosynthetically active, 153
Rates of leaf initiation, 691
Red clover, 611
Red/far-red ratio, 385, 691
Red light, 69, 95
Reflectance, 633
Rehydration, 39
Resistance analogues, 671
Respiration, 471, 493, 611; CN-resistant, 47
RH-531, 21
Rhamnaceae, 145
Rhamnus californica, 145

Rhizodermis organization, 39
Ribosomes, 487
Ribosome structure, 487
Ribulose bisphosphate carboxylase, 345
RNA polymerase I, 1
Root chilling, 457
Root hairs, 39
Root morphology, 641
Roots, 219, 247; short tuberized, 39
Rosaceae, 385, 451, 671

Safelight, 173
Salicaceae, 211
Salinity, 567, 575, 675
Scanning electron microscopy, 39
Scattering, 633
Scenedesmaceae, 195
Scenedesmus obliquus, 195
Secondary dormancy, 731
Secretion elicitors, 125
Seed germination, 47, 55, 385, 731
Selection, 77
Senescence, 721
Sensitivity, 89
Sensitivity amplification, 235
Shoot extension, 691
Shoots, 77
Sinapis alba, 39, 89, 235
Site of action, 427
Soil nitrogen, 641
Soil temperature, 559
Solanaceae, 5
Solute transport, 641
Soybean, 69
Spectroscopy, *in vivo*, 633
Spines, 153
Spirodela polyrrhiza, 507, 515
Starch accumulation, 657
Starch synthesis, 329, 417, 625
Stereological analysis, 515
Stomata, 95, 103, 219; guard cells of, 369
Stomatal conductance, 181, 451, 671, 703
Stomatal control, 145
Stomatal mechanism, 275
Stomatal movement, 427; control of, 369
Stratification, 385
Strawberry, 451
Stress, 281
Subunit structure, 1
Succulent, 711
Sucrose, 227; synthesis of, 329
Sugar beet, 675
Sugar uptake, 417
Synchronization, 227
Synergism, 731

Tapetum, 21
Taraxacum officinale, 433
Temperature, 47, 55, 153, 385
Tetraphenylphosphonium, 739
Threshold, 173
Thylakoid membrane, 311
Time-lapse photography, 401
Tissue culture, 77, 83
Tobacco, 77, 83
Tracheid length, 691
Tracheids, 703
Transcription, 1
Translocation hypothesis, 683
Transmembrane potential, 617
Transmittance, 633
Transpiration, 219, 703
Transport, 407

Transport pathway, 239
Trap lobes, 125
Tree stems, 255
Trifolium pratense, 611
Triticum aestivum, 219, 417, 625
Turgor, 545; regulation of, 683
Turion, 515; formation of, 507
Turnover, 111

Ultrastructure, 21, 515
Ultrastructural changes, 525
Ultraviolet radiation, 477
Uptake, 323, 427
Uptake isotherms, 407

Vacuole, 601
Valerianella locusta, 427
Vapour pressure deficit, 451
Vigna radiata, 457
Vigna sesquipedalis, 243

Water balance, 649
Water content measurement, 255
Water potential, 219, 671, 703
Water relations, 211, 575
Water storage, 649
Water stress, 219, 451, 671
Water-stress tolerance, 601
Water-use efficiency, 145
Water vapour saturation deficit, 703
Wheat (*Triticum aestivum*), 239, 417, 625
White mustard, 39
Wilting, 457
Wood avens, 385

Xanthium pennsylvanicum, 47, 55, 493

Zea mays, 203